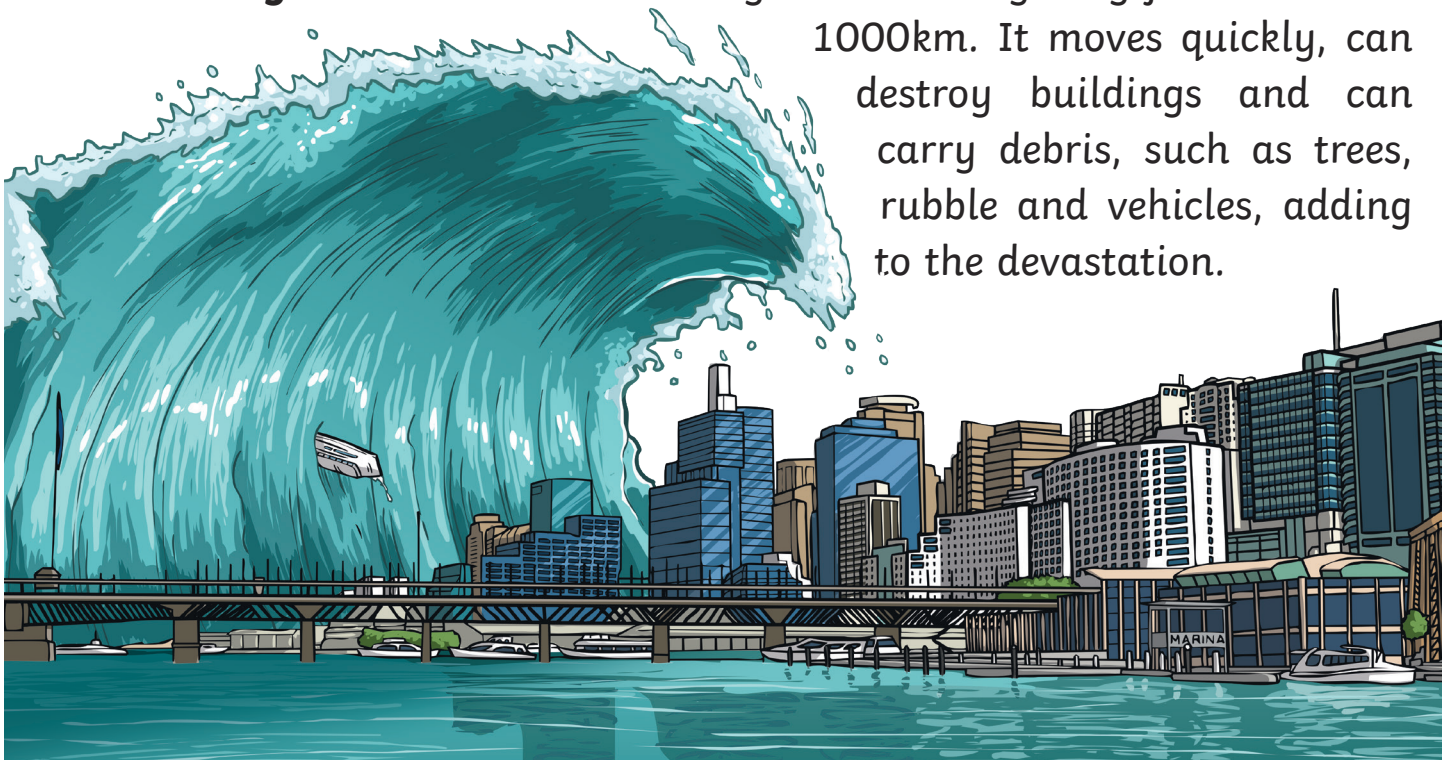
Tsunamis

The word tsunami comes from Japan and means 'harbour wave', 'tsu' meaning harbour and 'nami' meaning wave. But what is a tsunami?

A tsunami is a series of giant waves which grow stronger and bigger as they move through the ocean. They are most commonly caused by earthquakes beneath the ocean floor on top of the **tectonic plates** on the Earth's crust. This happens when the tectonic plates move into a new position after a build-up of pressure in the **magma** under the crust. Volcanic eruptions and ocean floor landslides can also cause tsunamis. If one of these forces lifts or drops a part of the ocean floor, it causes water to displace and move quickly through the ocean, causing a tsunami. Tsunamis are one of the Earth's most powerful natural destructive forces. They can travel through the ocean as fast as a jet plane at speeds up to 970kmh. Although tsunamis are sometimes called tidal waves, they have nothing to do with the tide.

If a tsunami happens in the open ocean, the waves can be as small as one metre and as they travel towards the shore, they grow in size. The waves of a tsunami can grow up to 35m, the same height as six giraffes! Once a tsunami reaches land, it can travel long distances; this is called the **wavelength**. A tsunami's wavelength can be anything from 150m to 1000km. It moves quickly, can destroy buildings and can carry debris, such as trees, rubble and vehicles, adding to the devastation.



Sometimes, small changes take place when a tsunami is approaching and warning signs can be spotted. These include the following:

- A sudden rise in sea level
- The sea retreating from the shore, leaving an unusual amount of exposed beach
- Unusual rumbling noises coming from the sea

Many places that experience tsunamis have official warning systems. The main one is based in Hawaii and is called the Pacific Tsunami Warning System. Its job is to track earthquakes which may cause tsunamis and alert everyone to act. Other warnings include signs, sirens and media announcements. The most common recommended actions are getting to higher ground or moving inland.

Eighty per cent of the world's tsunamis happen in the Pacific Ocean in an area called the Ring of Fire, where earthquakes and volcanic eruptions take place frequently.

The Asian tsunami on Boxing Day 2004 in the Indian ocean was one of the deadliest tsunamis ever recorded. It was caused by an earthquake which released the same amount of energy as 23,000 atomic bombs! The waves hit eleven countries, killed over 283,000 people and wiped out entire cities, leaving huge devastation.

Did You Know...?

Sometimes before a tsunami hits the water, is sucked away from the shore leaving fish and other sea creatures exposed and flapping about!

Glossary

Tectonic plates – massive slabs of rock which make up the Earth's crust

Magma – hot fluid below the Earth's crust which forms lava when cooled

Wavelength- how far a tsunami travels once its reached land

Questions

1. What does the word 'tsunami' mean? Tick the correct answer.

   - ◯ big waves
   - ◯ harbour wave
   - ◯ giant sea
   - ◯ small land wave

2. What causes a tsunami?

   - ◯ earthquakes
   - ◯ wind
   - ◯ nothing, they just happen
   - ◯ boats

3. What are the methods used to warn people that a tsunami is coming?

   _____

4. What is the wavelength?

   _____

5. How many of the world's tsunamis happen in the Pacific Ocean?

   _____

6. Why do you think it is important to get to a high point during a tsunami? How would it be best to get there?

   _____

   _____

7. If you were to invent a new way of alerting people to a tsunami, how would it work?

   _____

   _____

8. What makes a tsunami so devastating?

   _____

   _____

Answers

1. What does the word 'tsunami' mean? Tick the correct answer.

   ◯ big waves
   ✓ **harbour wave**
   ◯ giant sea
   ◯ small land wave

2. What causes a tsunami?

   ✓ **earthquakes**
   ◯ wind
   ◯ nothing, they just happen
   ◯ boats

3. What are the methods used to warn people that a tsunami is coming?

   Signs, sirens and media announcements

4. What is the wavelength?

   The wavelength is how far a tsunami can travel on land.

5. How many of the world's tsunamis happen in the Pacific Ocean?

   Eighty per cent of the world's tsunamis happen in the Pacific Ocean.

6. Why do you think it is important to get to a high point during a tsunami? How would it be best to get there?

   Answers may include: Water travels slower as it moves uphill, to stay safe, away from the waves

7. If you were to invent a new way of alerting people to a tsunami, how would it work?

   Learner's choice of answer

8. What makes a tsunami so devastating?

   Waves move quickly and destroy buildings taking debris and vehicles with them which adds to the damage.

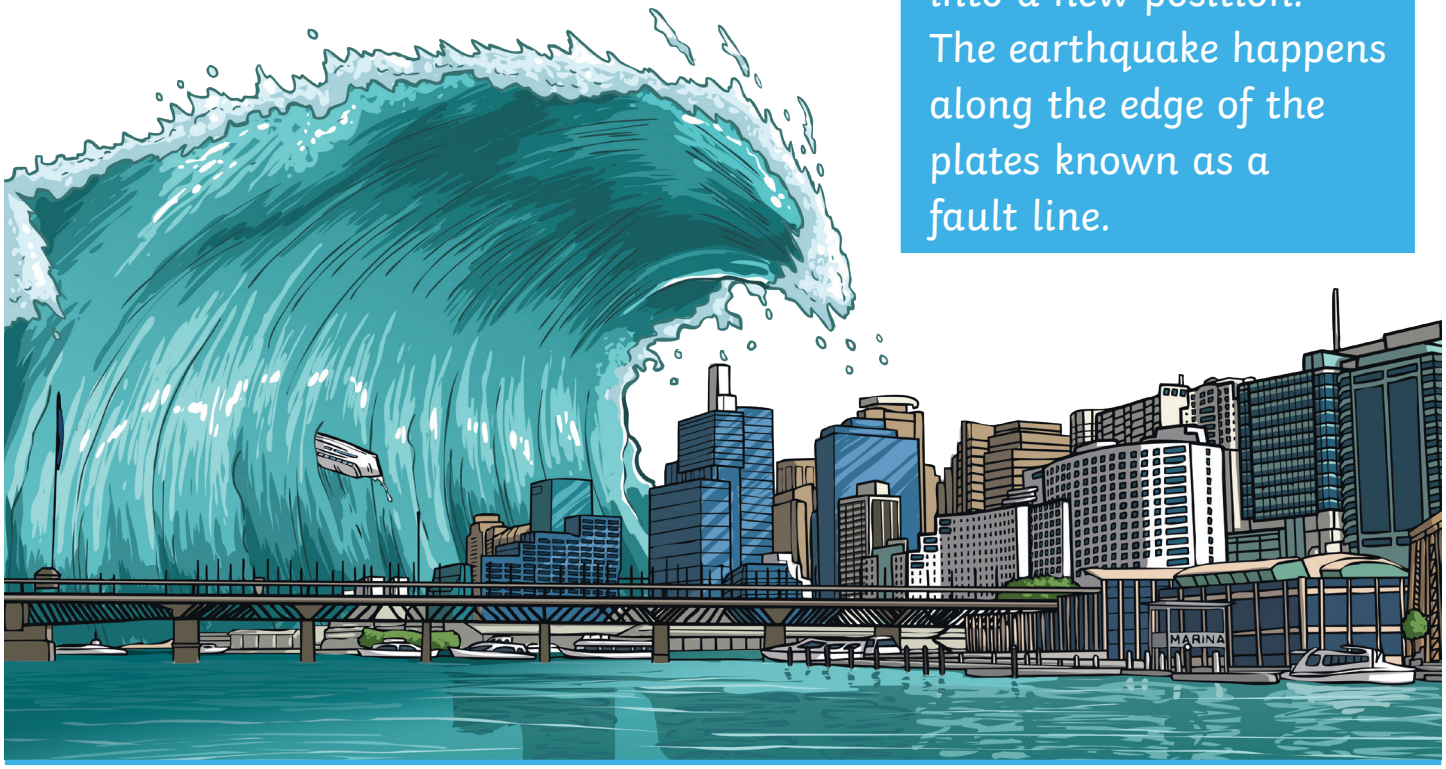
Tsunamis

The word tsunami comes from Japan and means 'harbour wave', 'tsu' meaning harbour and 'nami' meaning wave. But what is a tsunami and what causes them?

Tsunamis are one of the Earth's most powerful natural destructive forces and they are sometimes called Killer Waves. A tsunami is a series of giant waves which grow stronger as they move through the ocean towards the shore. They are most commonly caused by earthquakes beneath the ocean floor on top of the tectonic plates on the Earth's crust. If an earthquake lifts or drops a part of the ocean floor, it causes water to displace and move quickly through the ocean, causing a tsunami. They can travel through the ocean as fast as jet planes, travelling at speeds up to 970kmh! Although tsunamis are sometimes called tidal waves, they have nothing to do with the tide. Volcanic eruptions, ocean floor landslides and meteor strikes can also cause tsunamis. Eighty per cent of the world's tsunamis happen in the Pacific Ocean in an area called the Ring of Fire. This is where earthquakes and volcanic eruptions take place frequently but tsunamis happen all over the world.

Did You Know...?

An earthquake is caused when tectonic plates move suddenly into a new position. The earthquake happens along the edge of the plates known as a fault line.



If a tsunami happens in the open ocean, the waves can be as small as one metre and are hardly noticeable due to the depth of the water. As the waves travel towards the shore, they grow in size and gather speed. The highest recorded tsunami waves happened in 1958 in Lituya Bay Alaska where the waves measured 245m high!

Once a tsunami reaches the land, it travels quickly and can reach places up to 1000km from the shore. As it moves, it can destroy buildings and carry debris including trees, rubble and vehicles, adding to the devastation and danger to life. Remember, a tsunami is a series of giant waves known as a wave train and the first is usually not the biggest.

Subtle changes to the sea and land take place when a tsunami is approaching, including:

- a sudden rise in sea level or flooding at the shore;
- a sea retreat from the shore, sometimes creating a vacuum effect which can leave fish and other sea creatures exposed and flapping about;
- unusual rumbling noises coming from the sea;
- Earth tremors;
- animals behaving strangely or leaving.

Many places that experience tsunamis have official warning systems in place. The Pacific Tsunami Warning System is based in Hawaii and its job is to track earthquakes which may cause tsunamis and alert everyone that a tsunami may be approaching. Signs, sirens and media announcements are also used to warn people of an oncoming tsunami. The most common recommended actions are getting to higher ground and evacuating the area near the shore.

The Asian tsunami on Boxing Day in 2004 in the Indian Ocean is one of the deadliest tsunamis ever recorded. It was caused by an earthquake which released the same amount of energy as 23,000 atomic bombs! The waves hit eleven countries, killed over 283,000 people, including tourists who were celebrating Christmas, and wiped out entire cities, towns and areas.

Questions

1. What does the word 'tsunami' mean? Tick the correct answer.

   - ◯ big waves
   - ◯ harbour wave
   - ◯ giant sea
   - ◯ small land wave

2. What causes a tsunami?

   - ◯ earthquakes
   - ◯ wind
   - ◯ nothing, they just happen
   - ◯ boats

3. What are the subtle signs that warn that a tsunami is coming?

_____

_____

4. What is the wave train?

_____

_____

5. What is the name of the area where most of the world's tsunamis happen and where is it?

_____

_____

6. Why do you think it is important to get to a high point during a tsunami? How would it be best to get there?

7. If you were to invent a new way of alerting people to a tsunami, how would it work?

8. What made the Boxing Day tsunami so devastating?

9. A volunteer has arrived after a tsunami has hit. What jobs do you think they might be tasked with?

Answers

1. What does the word 'tsunami' mean? Tick the correct answer.

   ◯ big waves
   ✓ **harbour wave**
   ◯ giant sea
   ◯ small land wave

2. What causes a tsunami?

   ✓ **earthquakes**
   ◯ wind
   ◯ nothing, they just happen
   ◯ boats

3. What are the subtle signs that warn that a tsunami is coming?

   - **A sudden rise in sea level or flooding at the shore**
   - **A sea retreat from the shore, sometimes creating a vacuum effect which can leave fish and other sea creatures exposed and flapping about**
   - **Unusual rumbling noises coming from the sea**
   - **Earth tremors**
   - **Animals behaving strangely or leaving**

4. What is the wave train?

   The wave train is the series of waves that make up a tsunami.

5. What is the name of the area where most of the world's tsunamis happen and where is it?

   The Ring of Fire in the Pacific Ocean

6. Why do you think it is important to get to a high point during a tsunami? How would it be best to get there?

   Answers may include: Water travels slower as it moves uphill, to stay safe, away from the waves

7. If you were to invent a new way of alerting people to a tsunami, how would it work?

   Learner's choice of answer

8. What made the Boxing Day tsunami so devastating?

   Answers may include: Loss of cities, lives, areas and towns. People celebrating Christmas, it was meant to be a happy time.

9. A volunteer has arrived after a tsunami has hit. What jobs do you think they might be tasked with?

   Answers may include: rescuing people, helping people, rebuilding towns

Tsunamis

The word tsunami comes from Japan and means 'harbour wave', 'tsu' meaning harbour and 'nami' meaning wave. But what is a tsunami and what causes them?

Sometimes called Killer Waves, tsunamis are one of the Earth's most powerful natural destructive forces. A tsunami is a series of giant waves (or wave train) which grow stronger as they move rapidly through the ocean towards the shore and land. Tsunamis are most commonly caused by earthquakes below the ocean floor on top of the tectonic plates on the Earth's crust. They can also be caused by undersea **volcanic eruptions**, meteors and ocean landslides. If an earthquake lifts or drops a part of the ocean floor, it causes water to displace and move rapidly through the ocean, causing a tsunami. They can travel through the ocean as fast as jet planes at speeds up to 970kmh! Although tsunamis are sometimes called tidal waves, they have nothing to do with the tide.

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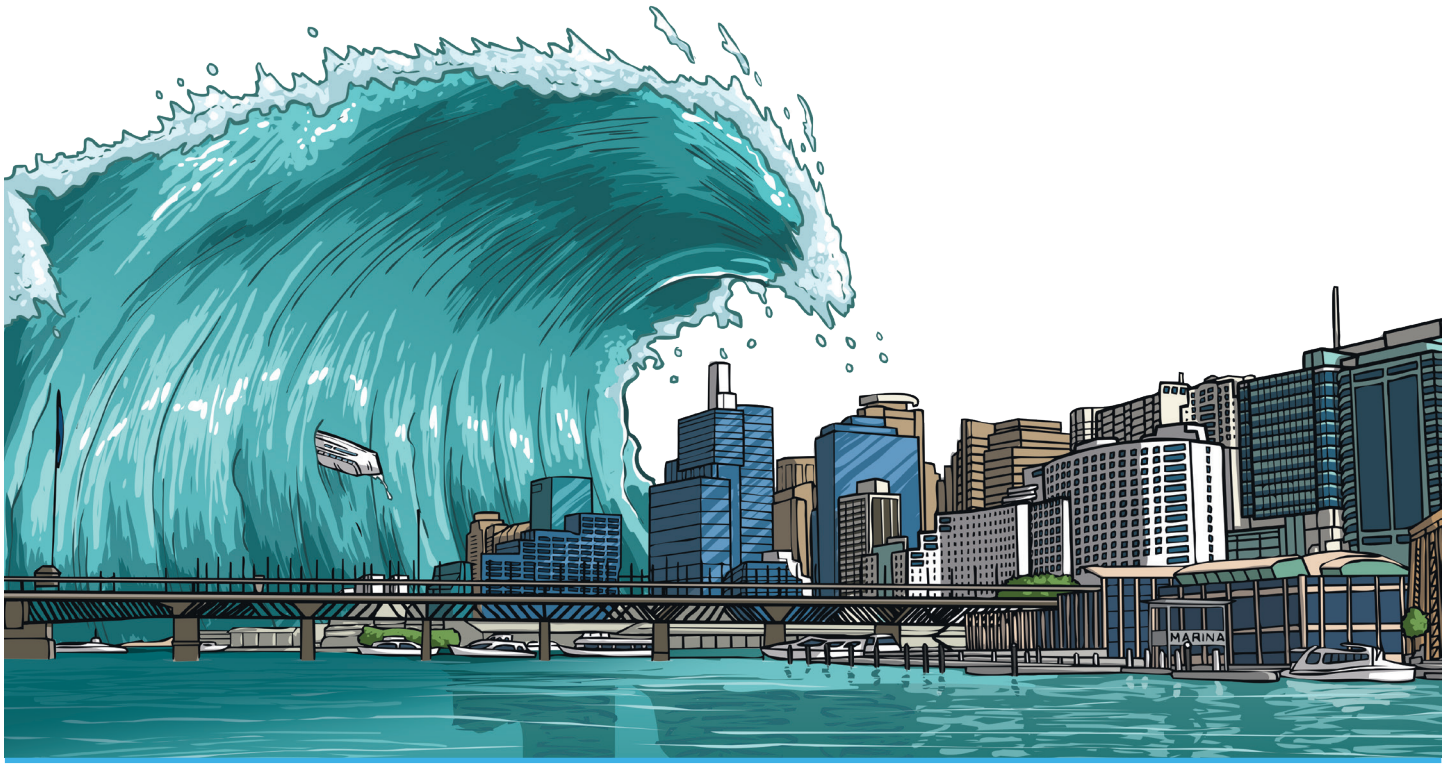

If a tsunami happens in the open ocean, the waves can be as small as one metre and are hardly noticeable due to the depth of the water. As the waves travel towards the shore, they grow in size and gather speed. The highest point the waves reach is called the **run-up**. The highest recorded tsunami waves happened in 1958 in Lituya Bay Alaska where the waves measured 245m high! Once a tsunami reaches land, it travels quickly and can reach places up to 1000km from the shore. This is known as the **area of inundation**. As it moves, it can destroy buildings and carry debris including trees, rubble and vehicles which, adding to the devastation and danger to life. Remember, a tsunami is a series of giant waves known as a wave train and the first is usually not the biggest.

Subtle changes to the sea and land take place when a tsunami is approaching, including:

- a sudden rise in sea level or flooding at the shore;
- a sea retreat from the shore, sometimes creating a vacuum effect which can leave fish and other sea creatures exposed and flapping about;
- unusual rumbling noises coming from the sea;
- Earth tremors;
- animals behaving strangely or leaving.

Many places that experience tsunamis have official warning systems in place. The Pacific Tsunami Warning System is based in Hawaii. Its job is to track earthquakes which may cause tsunamis and alert everyone that a tsunami may be approaching. The time at which a tsunami reaches land can be predicted accurately using calculations of the depth of water, distance from land and the time of the **trigger event**. Signs, sirens and media announcements are also used to warn people of an oncoming tsunami. The most common recommended actions are getting to higher ground and evacuating the area near the shore.

The Asian tsunami on Boxing Day in 2004 in the Indian Ocean was one of the deadliest tsunamis ever recorded. It was caused by an earthquake which released the same amount of energy as 23,000 atomic bombs! The waves hit eleven countries, killed over 283,000 people , including tourists who were celebrating Christmas, and wiped out entire cities, towns and areas.

Did You Know...?

A seiche is like a tsunami but happens in enclosed waters. It is smaller, less devastating and is normally triggered by wind.

Glossary

volcanic eruptions – magma rises to the surface and explodes through the crust

run-up – the highest point that the waves of a tsunami reach

area of inundation – the farthest distance a tsunami reaches

trigger event – an event, such as an earthquake, which causes a tsunami

Questions

1. What does the word 'tsunami' mean? Tick the correct answer.

   - ◯ big waves
   - ◯ harbour wave
   - ◯ giant sea
   - ◯ small land wave

2. What is the run-up?

   - ◯ the speed the tsunami travels at
   - ◯ the length of the largest wave
   - ◯ the distance the tsunami has travelled
   - ◯ the highest point that the waves reach

3. What are the subtle signs that warn that a tsunami is coming?

4. What is the area of inundation?

5. What is the name of the area where most of the world's tsunamis happen and where is it?

6. Why do you think it is important to get to a high point during a tsunami? How would it be best to get there?

7. If you were to invent a new way of alerting people to a tsunami, how would it work?

8. What made the Boxing Day tsunami so devastating?

9. A volunteer has arrived after a tsunami has hit. What jobs do you think they might be tasked with?

10. Why do you think the first wave of a tsunami is not normally the biggest?

Answers

1. What does the word 'tsunami' mean? Tick the correct answer.

   ◯ big waves
   ✓ **harbour wave**
   ◯ giant sea
   ◯ small land wave

2. What is the run-up?

   ◯ the speed the tsunami travels at
   ◯ the length of the largest wave
   ◯ the distance the tsunami has travelled
   ✓ **the highest point that the waves reach**

3. What are the subtle signs that warn that a tsunami is coming?

   - **A sudden rise in sea level or flooding at the shore**
   - **A sea retreat from the shore, sometimes creating A vacuum effect which can leave fish and other sea creatures exposed and flapping about**
   - **Unusual rumbling noises coming from the sea**
   - **Earth tremors**
   - **Animals behaving strangely or leaving**

4. What is the area of inundation?
   The area of inundation is the farthest point the tsunami reaches.

5. What is the name of the area where most of the world's tsunamis happen and where is it?

   The Ring of Fire in the Pacific Ocean

6. Why do you think it is important to get to a high point during a tsunami? How would it be best to get there?

   Answers may include: Water travels slower as it moves uphill, to stay safe, away from the waves

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   Learner's choice of answer

8. What made the Boxing Day tsunami so devastating?

   Answers may include: Loss of cities, lives, areas and towns. People celebrating Christmas, it was meant to be a happy time.

9. A volunteer has arrived after a tsunami has hit. What jobs do you think they might be tasked with?

   Helping people rebuild home, finding people, medical help, providing food etc.

10. Why do you think the first wave of a tsunami is not normally the biggest?

    Because waves gather in size and grow as they move towards land.